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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,371	01/14/2004	Yong Beom Kim	8733.048.20-US	2355
7590 09/29/2004			EXAMINER	
McKENNA LONG & ALDRIDGE LLP			DI GRAZIO, JEANNE A	
Song K. Jung			ART UNIT	
1900 K Street, N.W.			PAPER NUMBER	
Washington, DC 20006			2871	

DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/756,371

Applicant(s)

KIM ET AL.

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on Election of July 2, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 09/536,636.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413) .<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)               |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/14/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Priority*

Priority to Korean Patent Applications 1999-11108 (March 31, 1999) and 1999-48411 (Nov. 3, 1999) is claimed. This is a continuation of United States Patent Application 09/536,636 (March 28, 2000) now United States Patent 6,693,689.

### *Election/Restrictions*

Applicant's election without traverse of Species A (claims 1-10) in the reply filed on July 2, 2004 is acknowledged.

Claims 11-14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 2, 2004.

### *Claim Objections*

Claim 1 is objected to because of the following informalities. As to claim 1, drawn to a reflective liquid crystal display, the claim comprises a linear polarizer, a retardation film, a liquid crystal layer, a cholesteric liquid crystal color filter and a black background. However, the spatial relationship among these limitations is not set forth in the claim. As such, the claim recites a listing of elements without any clear relationship among the limitations.

For examination purposes, the Examiner reads the claim in light of the prior art of record.

Appropriate correction is **required**.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (APA) in view of United States Patent 6,339,464 B1 (to Anderson et al.) and further in view of United States Patent 5,493,430 (to Lu et al.).

As to claim 1, APA Figure 1 illustrates a conventional reflective liquid crystal display comprising the following elements: a linear polarizer for converting natural light into linearly polarized light (26), a retardation film (24) for converting the linearly polarized light into circularly polarized light and a liquid crystal layer (16) for receiving the circularly polarized light and varying the phase of the circularly polarized light depending on the presence of an applied electric field (electrodes 18 and 14 apply an electric field to the liquid crystal layer).

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APA Figure 1 does not appear to explicitly specify a cholesteric liquid crystal color filter for receiving the circularly polarized light from the liquid crystal layer, and selectively reflecting the circularly polarized light received from the liquid crystal layer.

Anderson teaches and discloses a filter and method of making an optical device (Title, entire patent). Anderson teaches that cholesteric color filters are especially preferable for several reasons. Cholesteric color filters can be used in systems with a large optical flux such as in projector systems and because unwanted light is reflected rather than absorbed, the filters are subjected to less thermal stress. The result is a display in which improved color stability and operating life is achieved (Anderson at Column 2, Lines 66-67 and Column 3, Lines 1-4).

Anderson is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to incorporate a cholesteric color filter into a reflective liquid crystal display for a filter subjected to less thermal stress so that color stability is improved and operating life is improved.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Anderson for improved color stability and operating life.

APA Figure 1 does not appear to explicitly specify a black background for absorbing a portion of light passing through the color filter.

Lu teaches and discloses a color reflective liquid crystal display (Title, entire patent). Lu teaches that typical reflective displays include a back plate that is painted black to absorb any non-reflected light. Lu teaches that as a result of the black paint on the back plate, the displays show the contrast of green, yellow or such other color determined by the cholesteric material

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pitch and black is preferred because it can provide for high contrast ratios (Lu at Column 1, Lines 35-42).

Lu is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to include a black background in a reflective liquid crystal display to absorb any non-reflected light such that contrast can be achieved and for a high contrast ratio.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Lu for contrast and for high contrast ratios.

As to claim 2, APA discloses that the retardation film is a  $\lambda/4$  plate.

As to claim 3, Lu teaches that a *back* plate is painted black to absorb any non-reflected light. Thus, the black back plate is presumably beneath a color filter.

As to claim 4, APA Figure 1 shows that the retardation film (24) is located between the linear polarizer (26) and the color filter (20).

As to claim 5, because the Lu back plate is painted black, it may be presumed that the black background is of a polymeric material.

As to claim 6, Anderson teaches and discloses that the cholesteric color filter bandwidth can be controlled by adjusting the pitch of the cholesteric liquid color filter (for example, Column 1, Lines 65-67 and Column 2, Line 1 and entire patent).

Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (APA) in view of United States Patent 4,589,734 (to Needham et al.) and further in view of United States Patent 6,339,464 B1 (to Anderson et al.) and further in view of United States Patent 5,493,430 (to Lu et al.).

As to claim 7, APA Figure 1 discloses a conventional reflective liquid crystal display in which first and second substrates (10 and 12) are opposite to and spaced apart from each other and a liquid crystal layer (16) interposed between the first (10) and second (12) substrates. Twisted nematic (TN) or super twisted nematic (STN) liquid crystal material, by way of non-limiting example, has at least a first switching mode in which a phase of light is changed while passing through the TN or STN material and a switching mode in which the phase of light is not changed while passing through the TN or STN material. APA Figure 1 discloses first (18) and second (14) electrodes for applying an electric field to the liquid crystal layer (16), a retardation film (24) located on the first substrate (10) for converting linearly polarized light into circularly polarized light, a linear polarizer (26) located on the retardation film (24), for converting linearly polarized light into circularly polarized light and a color filter (20).

APA does not appear to explicitly specify a semiconductor element for switching an electric signal applied to the liquid crystal layer.

Needham teaches and discloses a semiconductor wafer in the context of a polychromatic liquid crystal display and cholesteric material (entire patent). With reference to Figure 1, the silicon wafer (4) is located on a bottom substrate (second substrate) and applies a signal to the liquid crystal layer such that a polychromatic display is obtained (entire patent).

Needham is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to include a semiconductor element in a reflective display to enable polychromatic images.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Needham for polychromatic display.

APA Figure 1 does not appear to explicitly specify a cholesteric liquid crystal color filter for receiving the circularly polarized light from the liquid crystal layer, and selectively reflecting the circularly polarized light received from the liquid crystal layer.

Anderson teaches and discloses a filter and method of making an optical device (Title, entire patent). Anderson teaches that cholesteric color filters are especially preferable for several reasons. Cholesteric color filters can be used in systems with a large optical flux such as in projector systems and because unwanted light is reflected rather than absorbed, the filters are subjected to less thermal stress. The result is a display in which improved color stability and operating life is achieved (Anderson at Column 2, Lines 66-67 and Column 3, Lines 1-4).

Anderson is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to incorporate a cholesteric color filter into a reflective liquid crystal display for a filter subjected to less thermal stress so that color stability is improved and operating life is improved.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Anderson for improved color stability and operating life.



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APA Figure 1 does not appear to explicitly specify a black background for absorbing a portion of light passing through the color filter.

Lu teaches and discloses a color reflective liquid crystal display (Title, entire patent). Lu teaches that typical reflective displays include a back plate that is painted black to absorb any non-reflected light. Lu teaches that as a result of the black paint on the back plate, the displays show the contrast of green, yellow or such other color determined by the cholesteric material pitch and black is preferred because it can provide for high contrast ratios (Lu at Column 1, Lines 35-42).

Lu is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to include a black background in a reflective liquid crystal display to absorb any non-reflected light such that contrast can be achieved and for a high contrast ratio.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Lu for contrast and for high contrast ratios.

As to claim 8, APA discloses that the retardation film is a  $\lambda/4$  plate.

As to claim 9, because the Lu back plate is painted black, it may be presumed that the black background is of a polymeric material.

As to claim 10, Anderson teaches and discloses that the cholesteric color filter bandwidth can be controlled by adjusting the pitch of the cholesteric liquid color filter (for example, Column 1, Lines 65-67 and Column 2, Line 1 and entire patent).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289.

The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeanne Andrea Di Grazio  
Patent Examiner  
Art Unit 2871

JDG



TARIFUR R. CHOWDHURY  
PRIMARY EXAMINER